

REMARKS

The Applicants thank the examiner for his examination to date and respectfully request reconsideration and allowance..

Claims 1-4, 7-8, 10-19, 21-24, 26-28, 30-39, 41-44, 46-48, 50-59, 61-62, and 64-65 stand rejected. The independent claims are 1, 21, 41, and 61.

Based on the last office action, many claims appear to be allowable but for the double patenting issue (claims 27, 36, 39, 44, 51, 59, and 64-65). The Applicants explain below why additional claims should be allowed.

Independent claims 1, 21 and 41 have been amended to clarify that the tip is a nanoscopic or an SPM tip and that application of the patterning compound comprises transfer of a patterning compound from the tip to the substrate. This amendment is fully supported by the specification. See for example page 10, 2nd full paragraph, including lines 10-15, as well as the entire specification for support.

Claim 38 is objected to as an improper dependent claim for failure to further limit the subject matter of a previous claim. The Applicants respectfully traverse. Claim 38 depends on independent claim 21, and claim 21 limits pattern features to about 50 nm or less. Claim 38, in contrast, limits interfeature gaps to about 100 nm or less. One limitation pertains to feature size, while the other to spacing between the features. Therefore claim 38 properly limits subject matter of claim 21 under 37 C.F.R. 1.75(c). In any event, this objection should not prevent allowance. The Applicants are willing to cancel the claim if the examiner continues to see a problem.

Claim Rejections - 35 U.S.C § 102

I. Claims 1-4, 7, 12, 14 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,618,760 to Soh et al.

Applicants respectfully traverse. Every limitation of independent claim 1, upon which claims 2-4, 7, 12, 14 and 19 depend, is not present in Soh *et al.* ("Soh"). For example, as

amended, the claim limitation requiring “using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist” is not taught or inherent in this disclosure. Soh suggests using an SPM tip to locally deliver an electric field to a substrate to form a pattern (oxidized surface.) The method of directing an energy beam to a substrate for oxidizing the same is distinctly different from and unobvious over a method of applying a patterning compound from a tip to a substrate, as claimed. Claim 1 is therefore not anticipated. Dependent claims 2-4, 7, 12, 14 and 19 which also carry the limitations of claim 1 are also not anticipated. Applicants respectfully request withdrawal of this rejection.

II. Claims 1-4, 7, 10-12, 17, 19, 21-24, 30-32 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by the IBM Technical Disclosure Bulletin Publication (TDB) “Fabrication of Gold Nanostructures by Lithography with Self Assembled Monolayers.”

The Applicants respectfully traverse. Every limitation of independent claims 1 and 21, upon which the rest of the rejected claims depend, is not present in this disclosure. For example, as amended, the claim limitation requiring “using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist” is missing from this disclosure.

The tip described in this IBM paper does not displace one self-assembled monolayer (SAM) for another SAM. Rather, the tip is used for locally directing an electron beam. The method taught in this disclosure (see, for example, page 236 as well as figure 1), read as broadly as reasonable, is as follows:

(a) apply a first SAM (e.g. short thiol with amido functionality), which does not protect the gold surface against an etchant (e.g. CN^-/O_2), on a gold surface;

(b) locally remove first SAM with an energy source (e.g. electron beam) according to a desired pattern;

(c) apply a second SAM (e.g. hexadecanethiol), which is resistant to the aforementioned etchant, to the regions formerly covered with the first SAM; and

(d) etch the first SAM and gold layer below to produce gold nanostructures.

Most notably, the disclosure is silent how the first or second SAM layers are formed in steps (a) and (c). In the absence of teaching how a SAM is applied, specifically applying via a tip as claimed, this reference fails to show every limitation of the present invention as claimed. Therefore a case of 35 U.S.C. 102(b) is not established with this reference for independent claims 1, 21 and claims 2-4, 7, 10-12, 17, 19, 22-24, 30-32 and 37 dependent thereon. The Applicants respectfully request withdrawal of this rejection.

III. Claims 1-3, 7, 8 and 10-16 are rejected under 35 U.S.C. 102(b) as being anticipated by the Publication "Patterning Self-Assembled Monolayers: Applications in Materials Science to Kumar et al." (Langmuir, 1999)

The Applicants respectfully traverse. Every limitation of independent claims 1 upon which the rest of the rejected claims depend, is not present in Kumar *et al.* ("Kumar").

Kumar relates to a different technology: contact printing (or microcontact printing), which is a distinctly different process than claimed. Kumar does not disclose every element of the present invention as claimed. It does not disclose the steps of "providing a substrate and a nanoscopic or SPM tip" and "using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist." The stamp protrusions in Kumar are prepared by photolithography and do not suggest tips, particularly nanoscopic or SPM tips. Accordingly, the step of "providing a substrate and a nanoscopic or SPM tip" is not present in this reference. Furthermore, the step of "using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist" is also not shown in this reference because a nanoscopic or SPM tip is not taught.

IV. Claims 1-3, 7, 13-18, 21-23, 26, 33-35, 37, 38, 41-43, 46, 53-58, 61 and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,772,905 to Chou et al.

The Applicants respectfully traverse. This reference does not disclose every limitation of present invention as claimed. Particularly the limitations requiring “providing a substrate and a nanoscopic or SPM tip” and “using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist” are missing in this reference.

Chou *et al.* (“Chou”) discloses a method wherein an already deposited polymeric film is pressed with a stamp to form depressions thereon in the shape of the stamp pattern. The stamp does not transfer material onto the substrate. The portions of the film lying in the depressed regions are then removed resulting in a patterned region devoid of said film. This empty region is suggested as a mask for etching the underlying substrate or used for receiving another material. There is no nanoscopic or SPM tip used in this method or described in the disclosure overall. The pattern is not formed by transferring a patterning compound from a tip to a substrate. Clearly this reference fails to disclose every limitation of the present invention as claimed.

Therefore a case of 35 U.S.C. 102(b) is not established with this reference for independent claims 1, 21, 41, 61 and claims 2-3, 7, 13-18, 22-23, 26, 33-35, 37, 38, 42-43, 46, 53-58, 62 which dependent thereon. The Applicants respectfully request withdrawal of this rejection.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 17, 18, 21-23, 26, 28, 30-35, 37, 38, 41-43, 46-48, 50 and 52-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Publication “Patterning Self-Assembled Monolayers: Applications in Materials Science to Kumar et al.”

The Applicants respectfully traverse. The claimed invention is not disclosed in Kumar, nor is it obvious in view thereof. Particularly the limitations of “providing a

substrate and a nanoscopic or SPM tip” and “using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist” are missing in this reference. Examiner is directed to the arguments presented subsection III above, which are hereby incorporated into this section.

The office action suggest that the methods of Kumar and the instant invention are the same and therefore features created therewith would have the same attributes (e.g. size and spacing). The present invention relates to a method capable of high resolution nanolithographic printing, whereas Kumar describes lower resolution microcontact printing. Furthermore, Kumar does not describe a method whereby a patterning compound is applied from a nanoscopic or SPM tip onto a substrate. Clearly these methods are not the same nor obvious variants. Accordingly, claims 17, 18, 21, 37, 41, 56-58 which contain limitation to feature size and/or spacing are not rendered obvious in view of this reference.

Obviousness rejection of dependent claims 22-23, 26, 28, 30-35, 38, 42-43, 46-48, 50 and 52-55 is also overcome since limitations of the independent claims 21 and 41, from which they depend, are not present in Kumar. Specifically the limitation of “providing a substrate and a nanoscopic or SPM tip” and “using the tip to apply a patterning compound from said tip to the substrate so as to produce a desired pattern which is a chemical etching resist” are not obvious in view of Kumar. Therefore, a case of 35 U.S.C 103(a) has not been established in view of Kumar and applicants respectfully request withdrawal of this rejection.

Claim Rejections – Statutory Double Patenting

Claims 1-4, 7, 8, 10-19, 21-24, 26-28, 30-39, 41-44, 46-48, 50-59, 61, 62, 64 and 65 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,635,311 in view of the Publication “Patterning Self-Assembled Monolayers: Applications in Materials Science to Kumar et al.”

The Applicants respectfully traverse but propose that they can overcome this rejection by providing a terminal disclaimer against U.S. Patent 6,635,311 when all other issues are resolved.

Claims 1-4, 7, 8, 10-19, 21-24, 26-28, 30-39, 41-44, 46-48, 50-59, 61, 62, 64 and 65 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-192 of U.S. Patent No. 6,827,979 in view of the Publication "Patterning Self-Assembled Monolayers: Applications in Materials Science to Kumar et al."

The Applicants respectfully traverse but propose that they can overcome this rejection by providing a terminal disclaimer against U.S. Patent 6,827,979 when all other issues are resolved.

The Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

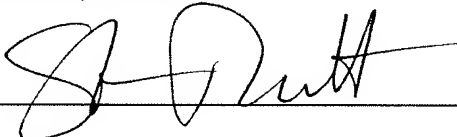
The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

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FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5351
Facsimile: (202) 672-5399

Respectfully submitted,

By 

Steve Rutt
Attorney for Applicant
Registration No. 40,153

S. Isaac Zaghi
Registration No. 55,951